

A 3D cutaway diagram of a particle detector, likely a calorimeter, showing various internal components in different colors (red, green, blue, yellow, orange) and a central beam pipe. The diagram is semi-transparent, revealing the internal structure.

Standardized Calorimetry QA

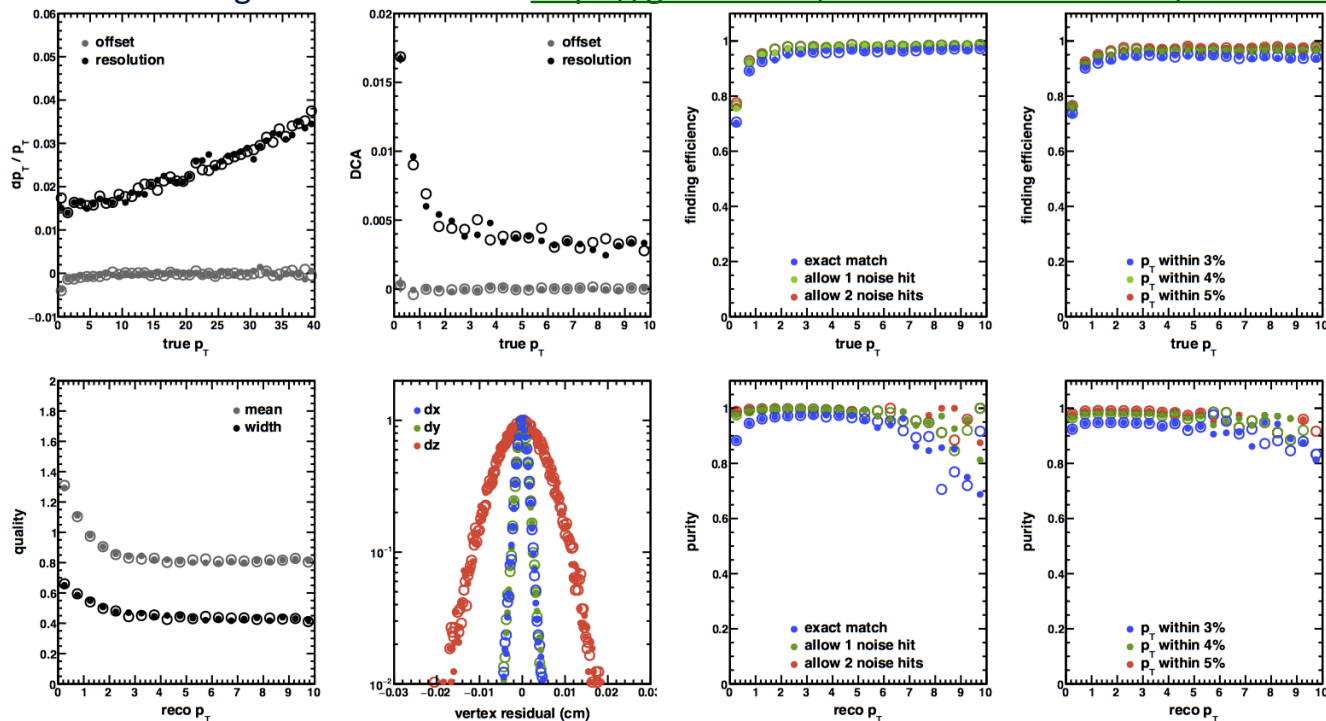
Part II of III – Jet QA

Jin Huang (BNL)

Introduction

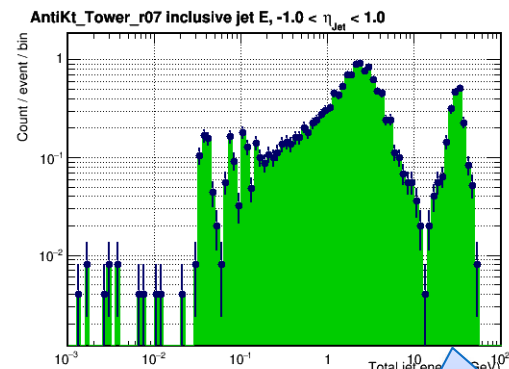
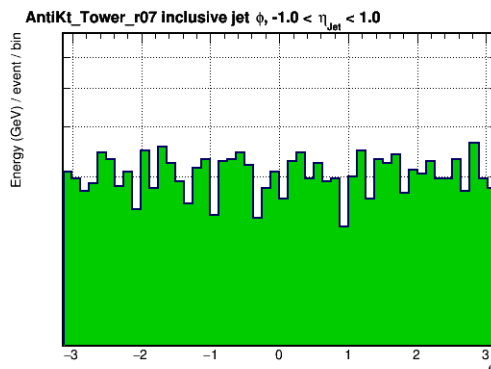
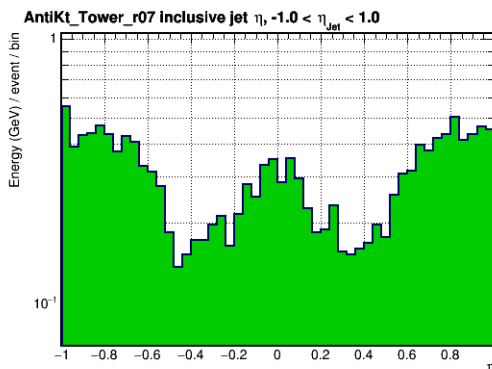
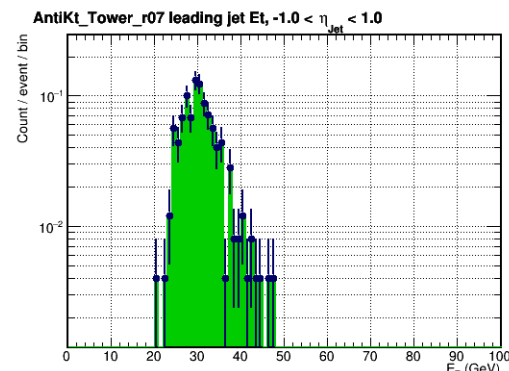
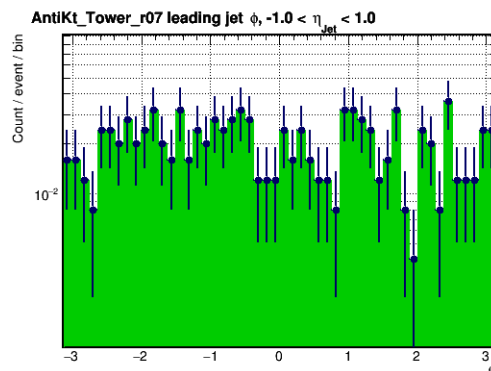
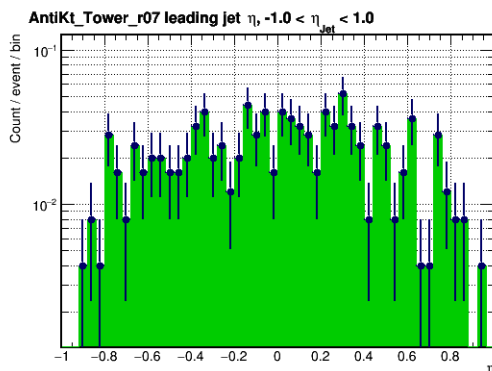
- ▶ Today's discovery is tomorrow's calibration
- ▶ We need a standardized module to quickly check calorimetry performance, similar to that of tracking check from Mike
- ▶ Connected to plan on implementing QA history for ANA builds and new code submissions.
- ▶ Planning three QA modules 1) each of three subsystems 2) tracking + three calorimeter 3) jets.
- ▶ First of the three stage merged via pull request <https://github.com/sPHENIX-Collaboration/coresoftware/pull/104>
- ▶ This talk focus on next one on jet: <https://github.com/sPHENIX-Collaboration/coresoftware/pull/105> looking for suggestions before formalize it.

Standardized tracking check from Mike: <https://github.com/sPHENIX-Collaboration/coresoftware/pull/89>



Reconstructed tower jet spectrum

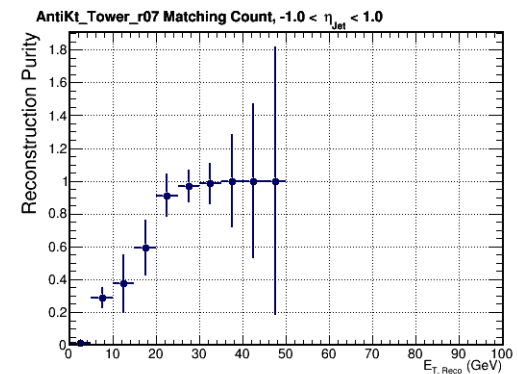
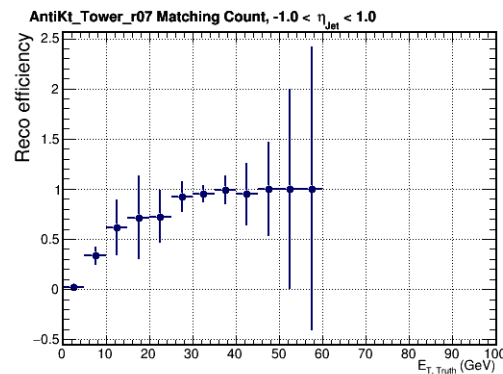
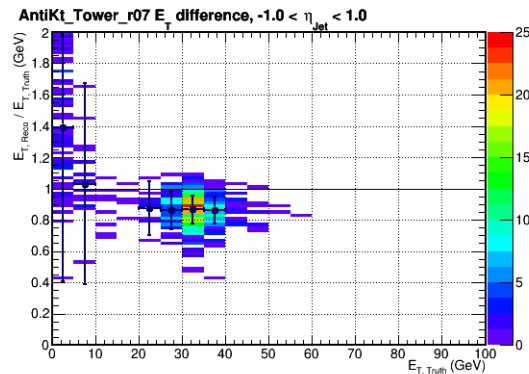
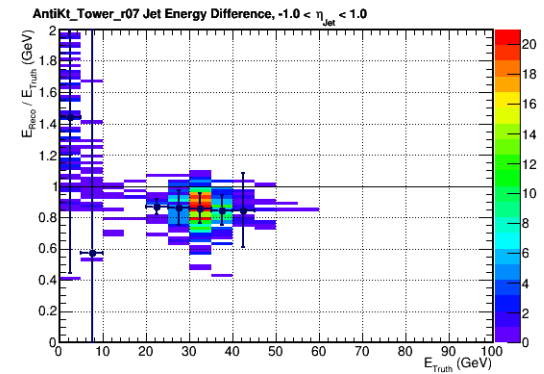
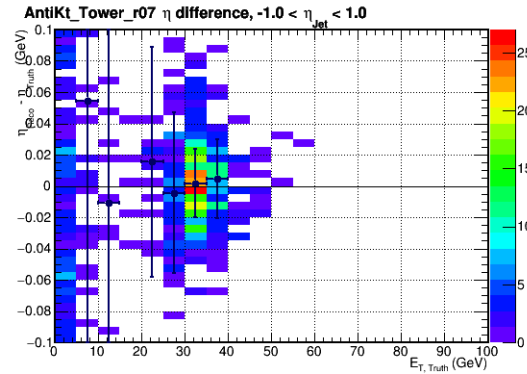
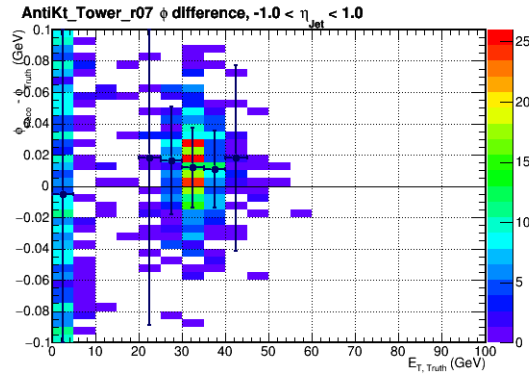
- Pythia8 200pp, $s > 25\text{GeV}$, truth jet trigger $E > 30\text{GeV}$
- Use itself as reference for now....



Pythia trigger
threshold, 30GeV

Truth Matching (still need statistics)

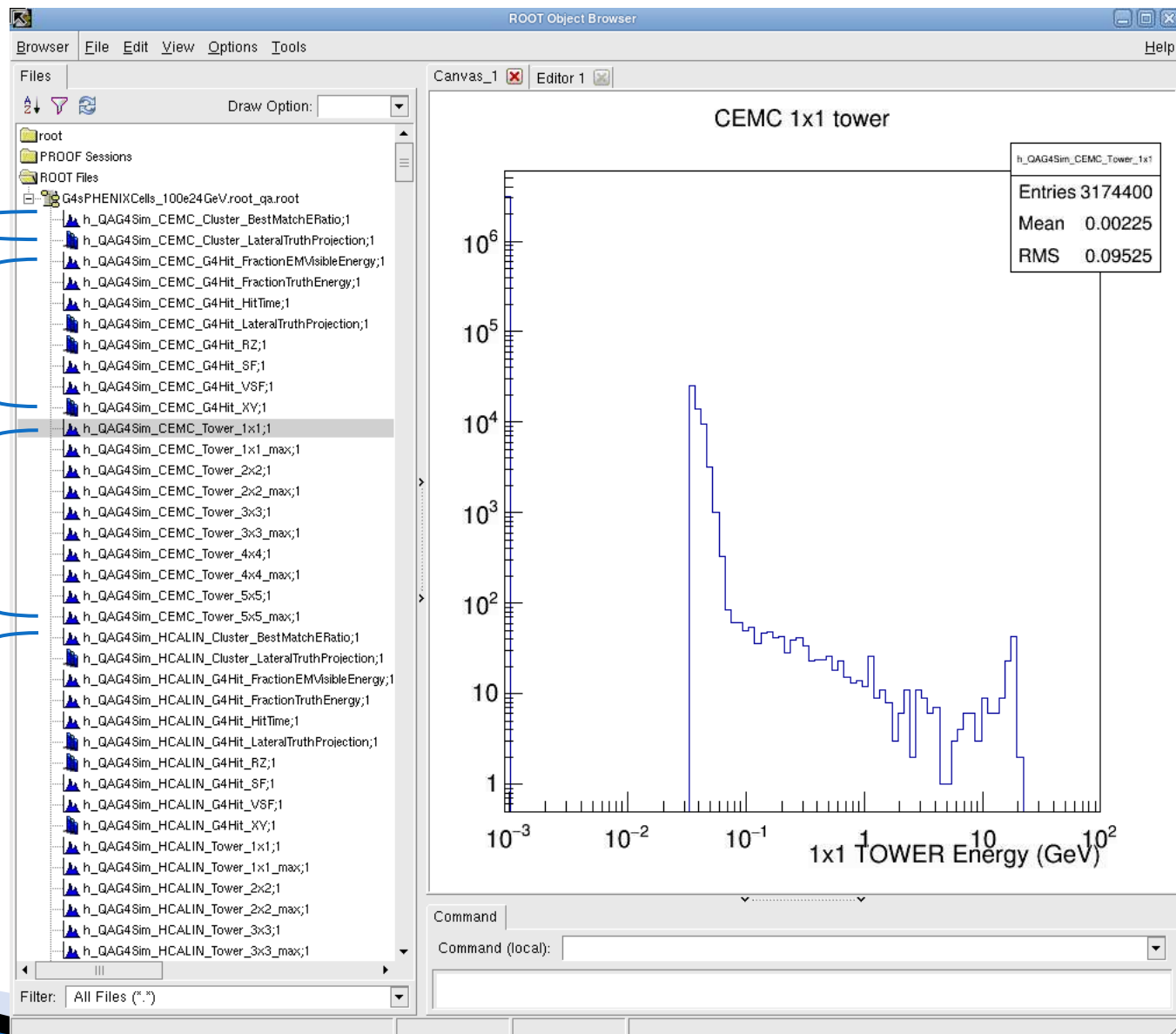
- Pythia8 200pp, $s > 25\text{GeV}$, truth jet trigger $E > 30\text{GeV}$
- Use itself as reference for now....



Extra information



QA histogram overview



CEMC/Clusters

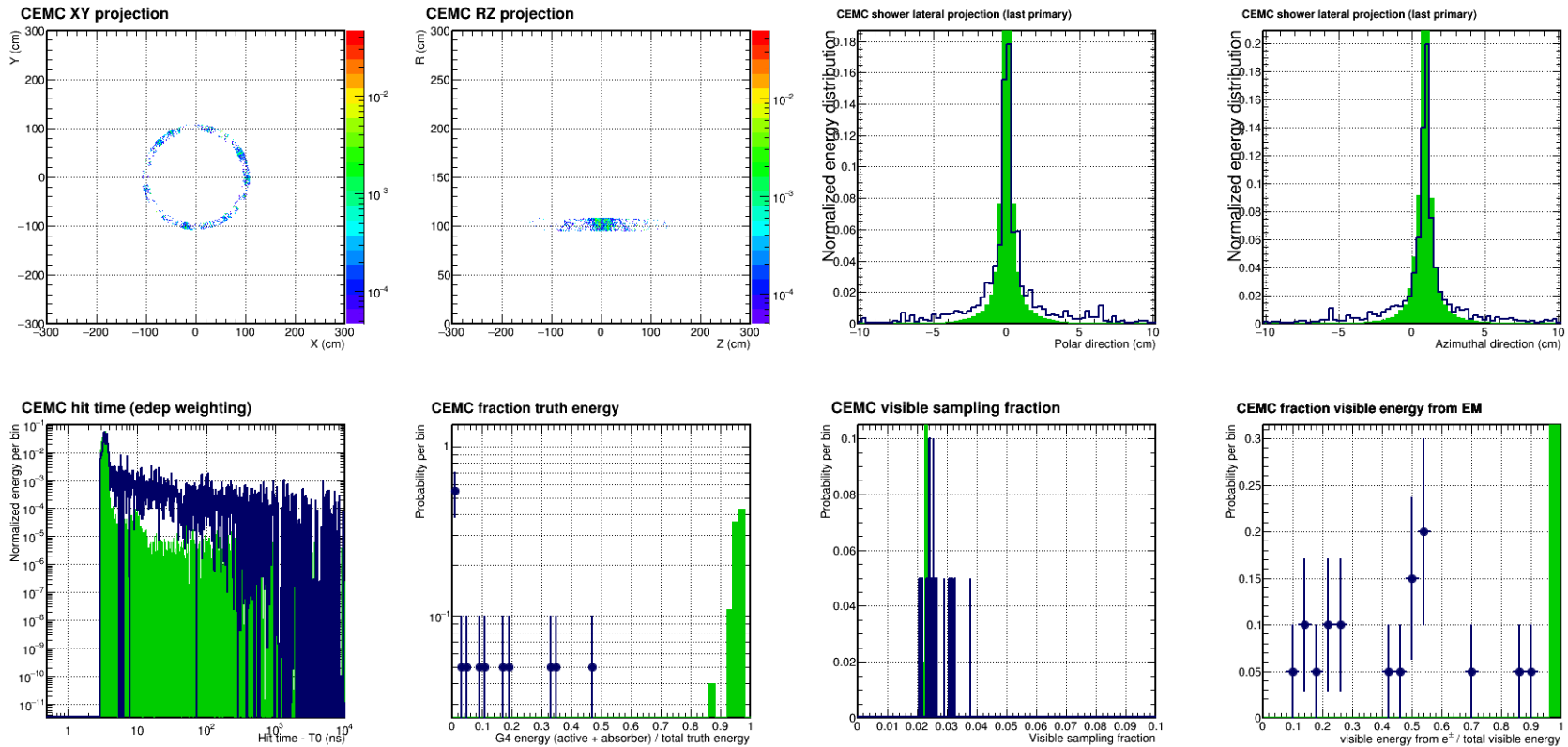
CEMC/Geant4 checks

CEMC/Towers

HCALIN/HCALOUT/...

CEMC example

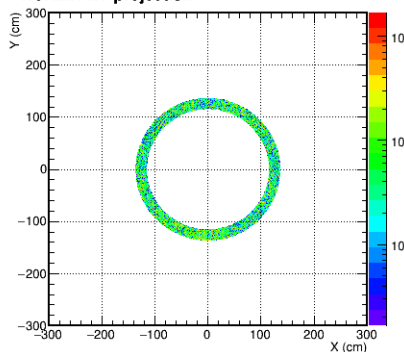
- 24GeV pi- simulation in inspection
- 24GeV e- simulation as reference



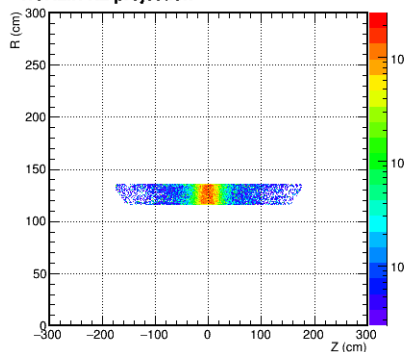
HCALIN

- 24GeV pi- simulation in inspection
- 24GeV e- simulation as reference

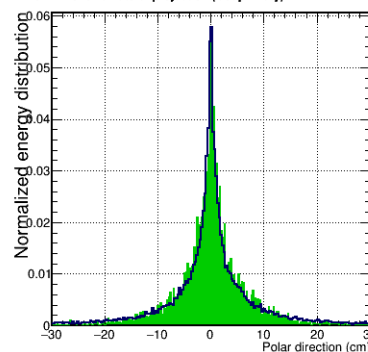
HCALIN XY projection



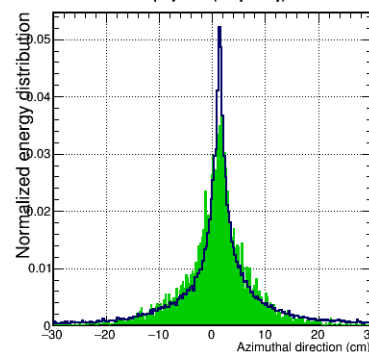
HCALIN RZ projection



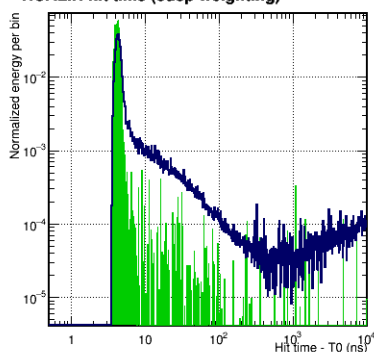
HCALIN shower lateral projection (last primary)



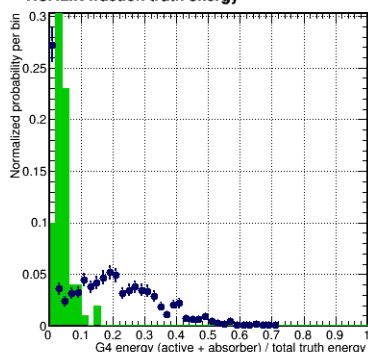
HCALIN shower lateral projection (last primary)



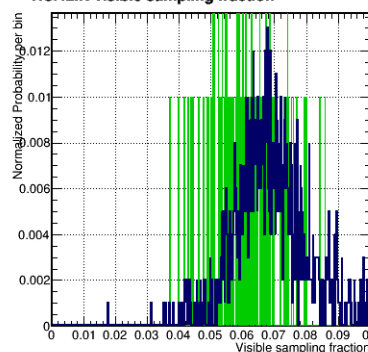
HCALIN hit time (edep weighting)



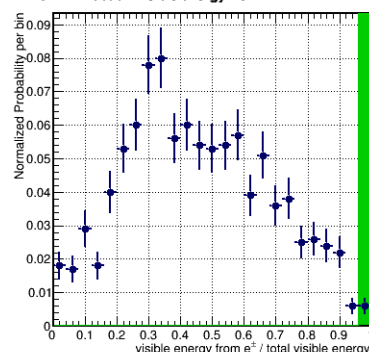
HCALIN fraction truth energy



HCALIN visible sampling fraction

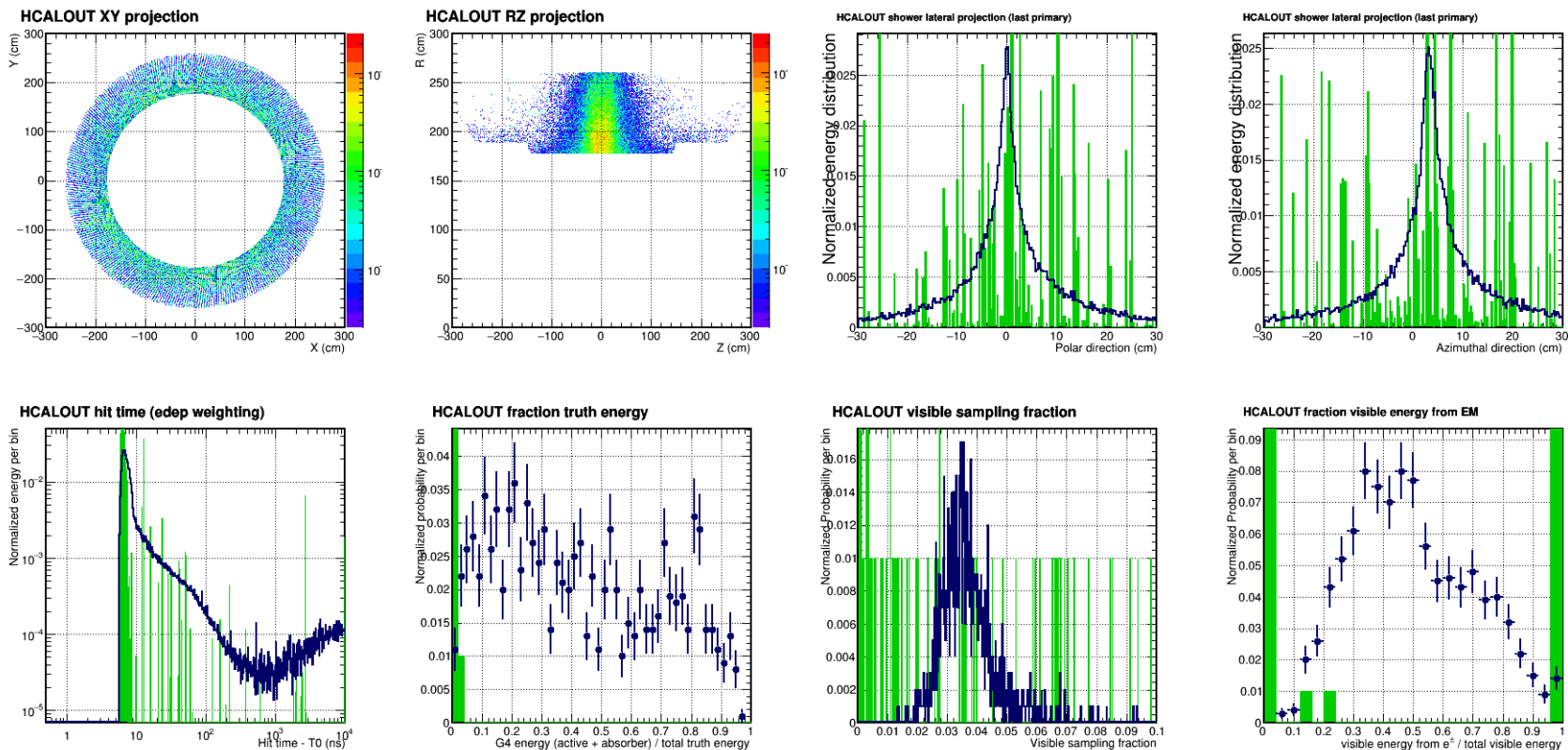


HCALIN fraction visible energy from EM



HCALOUT

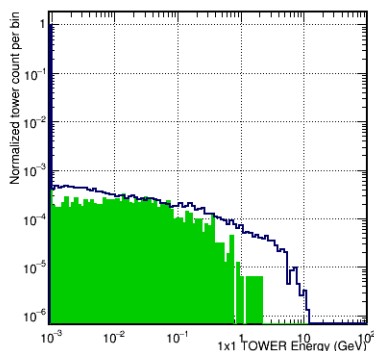
- 24GeV pi- simulation in inspection
- 24GeV e- simulation as reference



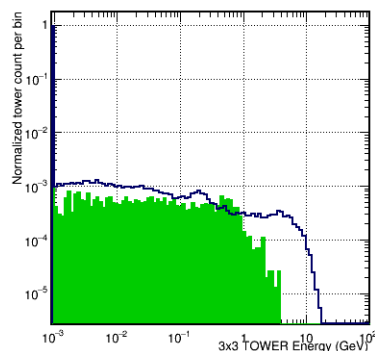
HCALIN

- 24GeV pi- simulation in inspection
- 24GeV e- simulation as reference

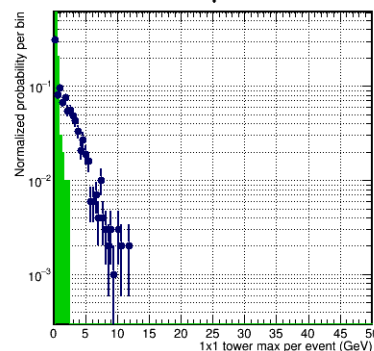
HCALIN 1x1 tower



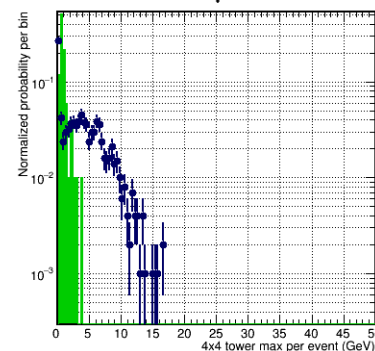
HCALIN 3x3 tower



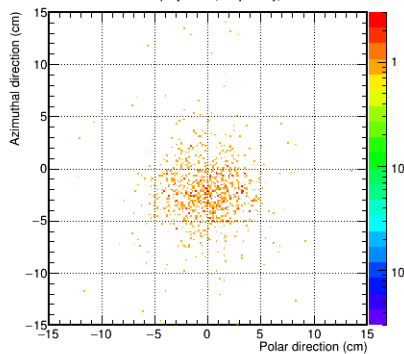
HCALIN 1x1 tower max per event



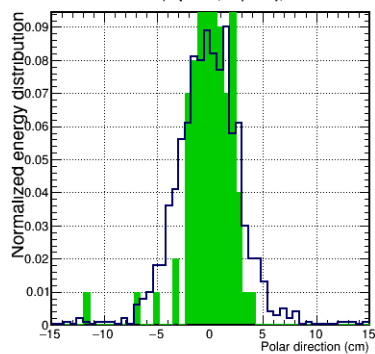
HCALIN 4x4 tower max per event



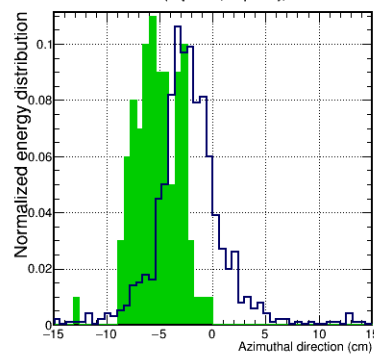
HCALIN best cluster lateral projection (last primary)



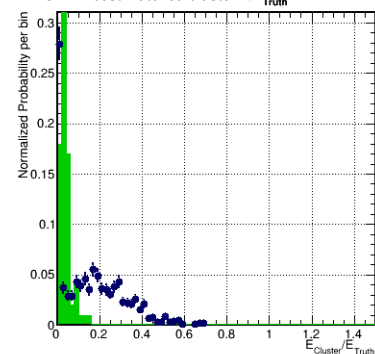
HCALIN best cluster lateral projection (last primary)



HCALIN best cluster lateral projection (last primary)



HCALIN best matched cluster E/E_{Truth}



HCALOUT

- 24GeV pi- simulation in inspection
- 24GeV e- simulation as reference

